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mapping the Ruby and Irwin regions preliminary to future geologic work. The country lying between Beckwith, Marcellina, and Anthracite Mountains was also worked up, and each of those points occupied, and the valley of Ohio Creek surveyed. In the early part of September, work was begun in Poverty and Washington gulches and in Baxter basin, and the East River valley, between Schofield, Gothic, and Crested Buttes. Fair results were obtained, although

severe snow-storms impeded progress. About the middle of the month Mr. Karl was directed to co-operate with special agent J. A. Bently, of the Interior department, to ascertain the accuracy of the Land-office survey of the Maxwell grant in southern Colorado and northern New Mexico. He was occupied on this work the remainder of the season, and in the latter part of November presented to the court a map prepared by him in support of his evidence.

RECENT PROCEEDINGS OF SCIENTIFIC SOCIETIES.

Chemical society, Washington.

Feb. 23. — Mr. W. H. Seaman exhibited and described a new form of burette, and also a graduated pipette, modelled after the ordinary medicine-dropper. — Prof. F. W. Clarke exhibited a copy of Lothar Meyer's curve of atomic volumes, drawn to large scale, with the most recent data. With it, upon the same sheet, was compared a similar curve of melting-point.

Biological society, Washington.

Feb. 23. — Dr. Elliott Coues read a paper on the present state of North-American ornithology. In discussing the precontemporaneous history of the subject, he defined the following epochs: 1, The archaic (prior to 1700); 2, The pre-Linnean (1700-50); 3, The post-Linnean (1750-1800); 4, The Wilsonian (1800-25); 5, The Audubonian (1825-50); and, 6, The Bairdian (1850+). A number of periods were also defined as follows: 1. The Lawsonian (1700-30); 2. The Catesbian (1730-48); 3. The Edwardsian (1748-58); 4. The Linnean (1758-66); 5. The Fosterian (1766-85); 6. The Pennantian (1785-90); 7. The Bartramian (1790-99); 8. The Vieillotian (1800-1808); 9. The Wilsonian (1808-24); 10. The Bonapartian (1824-31); 11. The Richardsonio-Swainsonian (1831-32); 12. The Nuttallian (1832-34); 13. The Audubonian (1834-53); 14. The Cassinian (1853-58); 15. The Bairdian. The establishment of the American ornithologists' union, he thought, would probably mark the establishment of a new epoch, — one in which the existing intricacies of ornithological nomenclature will be replaced by a consistent system founded upon a rational code: the present is simply a period of transition. Dr. Coues laid before the society the plate proofs of the forthcoming new edition of his *Key to North-American ornithology*.

Mr. C. D. Walcott exhibited a second time the rocks from Maine, containing fossil corals. He stated, that having received a number of additional specimens of the granite-like rock containing fossils, *Stromatopora*, corals, plates of crinoid stems, etc., from Litchfield, Me., he found that he had been incorrect in calling the rock a granite, as it was of sedimentary origin, — a clastic rock, so changed in the specimens examined that it might be called a conglomerate gneiss.

Prof. Lester F. Ward exhibited a specimen of the

'diamond willow,' — a variety of *Salix cordata* occurring in the upper Missouri region, distinguished by a great exaggeration of the scars left by the early growths of limbs which form series of large diamond-shaped cavities along the stems. He also exhibited some canes carved by the people of that region, which show the so-called diamonds in a striking manner. Professor Seaman advanced the theory that these scars are caused by the influence of some fungus or of some insect which lays its eggs in the buds.

Linnaean society, New York.

Feb. 8. — The publication of vol. ii. of the *Transactions* was ordered. — Dr. C. Hart Merriam read a biography of the muskrat (*Ondatra zibethicus*), giving its life-history as noted by him in the Adirondack region of north-eastern New York. The paper was followed by a general discussion as to its differing habits in a less boreal locality. — A translation from the Spanish of Rafael Montes de Oca by L. S. Foster, and the subsequent discussion, developed many interesting facts concerning the *Trochilidae*. — Mr. William Dutcher remarked upon the scarcity of the snowy owl (*Nyctea scandiaca*) this winter on Long Island, and upon the presence in considerable numbers of the thick-billed guillemot (*Lomvia arctica*), as well as the razor-billed auk (*Utamania torda*); while not a single sea-dove (*Alle nigricans*) had come under his observation. His Long Island records for the Ipswich sparrow (*Passerculus princeps*) give the capture of thirty-three specimens since their arrival, Dec. 16, after a severe snow-storm.

Academy of natural sciences, Philadelphia.

Jan. 22. — Mr. F. W. Putnam made a communication on a group of mounds occurring on the Miami River, which in many respects he considered the most important in the country. The methods of investigation, and the objects found in the mounds referred to, were described in detail, and illustrated by means of specimens and photographs. While no doubt exists as to the construction of mounds by some of our existing Indians, those he described had absolutely nothing in common with the more modern structures, except in so far as they indicated the Mongoloid type.

As the essentially fresh-water character of the worm *Manayunkia speciosa* (the forms related to

which are all marine) had not heretofore been unquestionably established, Mr. Edward Potts believed that it would be of interest to record that he had in his possession specimens from the Schuylkill River above the dam, and therefore from absolutely fresh water. The currents produced by the cilia on the tentacles were claimed to be excurrent, and not incurrent, as might have been expected, the feeding processes in some cases being performed by the tentacles themselves.

Jan. 29. — Prof. J. Leidy directed attention to a collection of fossil bones which had been submitted to his examination by the Smithsonian institution. They were obtained at the mine of the American salt company, near New Iberia, La. They chiefly consist of remains of *Mastodon americanus*, of *Equus major*, of an *Equus* not distinguishable from the domestic horse, and of *Myiodon Harlani*. Of the *Mastodon*, the collection contained well-preserved molar teeth, and characteristic fragments of bones. Of the *Equus major*, there are vertebrae, fragments of long bones, and a number of teeth. Of *Myiodon*, there are several molar teeth, vertebrae, and other bones, mostly fragments. Among these are two mature and well-preserved tibiae, the best specimens yet discovered of the species. They are identical in form and size with those of *M. robustus*, indicating *M. Harlani* to have been a species of the same size as the former.

Prof. J. Leidy stated that he had recently received for examination, from Mr. B. W. Thomas of Chicago, several glass slides with mounted specimens of sand. These were obtained by washing clay from the boulder drift of Meeker county, Minn. In the specimens Professor Leidy recognized some well-preserved and characteristic foraminifera, of which two forms appeared identical with *Sextularia globulosa* and *Rotalia globulosa*, now living in the Atlantic Ocean. The fossils Mr. Thomas supposes to be derived from a soft yellow rock, cretaceous shale and lignite forming part of the drift. He also reports the finding of fragments of marine diatoms in the clay. Professor Heilprin suggested that the foraminifera referred to had probably been washed from underlying Silurian rocks.

Feb. 5. — A communication was read from Miss S. G. Foulke, describing a new species of rotifer under the name *Apsilus bipera*. The specimens were found in Fairmount Park; and, in common with all members of the genus, they possess, instead of rotatory organs, a membranous cup or net, which is used for the capture of food. The specific distinction of the form now described consists chiefly in the structure of the net, the presence of a true stomach in addition to the usual crop, and the presence of cilia inside the net. It was proposed to unite the forms *Apsilus lentiformis* Meczynchoff, *Dictyophora vorax* Leidy, *Cupelopagus lucinedax* Forbes, and the species now described, under one genus, *Apsilus*, in consequence of their strong points of resemblance. These are, briefly, the presence of two eye-spots, of a membranous crop instead of rotatory organs, of a mastax exactly alike in all, and the absence of a tail or foot-stalk.

Prof. H. Carvill Lewis announced the discovery of fossils in the triassic red shale from the neighborhood of Phoenixville, and gave a preliminary notice of them. They occurred in soft red rock at the southern entrance to the new tunnel, in strata dipping 10° N. 30° W., which would place the bed considerably below the strata of the old tunnel, perhaps a thousand feet, unless faults intervened. The specimens consist of some five distinct species of lamellibranch shells, a ganoid fish, some plants, and a doubtful fragment of a saurian bone. Among the shells are two species of *Unio*, somewhat resembling *U. calceolus* and *U. lanceolatus* of Lea. These are, of course, of fresh-water origin, and are found in single and double valves, and open. Three species of marine shells also occur in the collection; and the apparent commingling of fresh-water and marine species was referred to as an interesting fact. The shells, which in most instances lay parallel with the bedding, were frequently distorted by the movement of the shale. The *Unios* were regarded as probably the most ancient yet discovered, some specimens found in New Mexico being of later age. The coal-plants represented are fresh-water species, but reference was made to a triassic marine fucoid described by the speaker some years ago. The fish belongs to the lepidogonoids, and resembles the *Catopteris gracilis* of Redfield.

Engineers' club, Philadelphia.

Jan. 19. — Mr. Wilfred Lewis read a paper upon the resilience of steel, reviewing some of the means employed for the storage of energy, and showing the place occupied by steel among them. Among the means now employed, compressed air, hot water, and the storage battery were cited from an English writer as being about equal in value, and as giving out about 6,500 foot-pounds of work per pound of material used. Steel springs, according to the same writer, were said to yield about 18 foot-pounds per pound. In this connection, the project of using steel springs as a motor for street-cars was referred to as the most hopeless of all possible means of locomotion. To test the accuracy of this statement in regard to steel, several experiments were made by the writer upon tempered specimens, both for tension and flexure. Contrary to expectation, the highest results were shown by the flexure of a small spiral clock-spring weighing 2,040 grains, which gave out, when wound up, about 45 foot-pounds of energy; or, in other words, 154 foot-pounds per pound. The transverse strength of this steel, within the elastic limit, was found to be about 300,000 pounds per square inch, and its modulus of elasticity about 30,000,000. Such extraordinary strength, with such a low modulus, was so far beyond conjecture, that it seemed to give a new hope for the success of the project referred to; but, after making the necessary allowances for weight of car and efficiency of driving mechanism, it was found that not more than about 20 foot-pounds per pound of car would be available for locomotion. It was therefore improbable that such a car could ascend a hill over twenty feet high. It was also a matter of

doubt, whether larger springs could be made to show results which would even approach these figures; and on this account the experiments about to be tried might be looked for with some interest. — Mr. H. C. Lüders exhibited specimen of rolled and annealed phosphor-bronze of maximum ductility, and consequently of minimum tensile strength, and submitted the following data of the test thereof: length, 2"; diameter, 0.57"; subjected to a strain of 13,620 pounds, equivalent to 53,400 pounds per square inch; elongation, 70.5%; reduced area at point where fracture would occur, 0.3"; elastic limit, about 18,000 pounds per square inch. Hard-rolled rods, tested without turning off the surface, have shown a tenacity exceeding 90,000 pounds per square inch. — Mr. Howard Murphy presented for Mr. Louis C. Madeira, jun., the Record of American and foreign shipping, containing an interesting set of drawings for the details of construction of iron ships. — Mr. Percival Roberts, jun., gave some account of the results of experiments, now being conducted by Mr. James Christie at Pencoyd, upon the relative elasticity of iron and steel structural shapes.

NOTES AND NEWS.

WE noticed a fortnight ago the presentation of the Lyell medal of the Geological society of London to Professor Leidy; and we now learn that the council of the society at the same time awarded to Mr. Leo Lesquereux the sum of twenty pounds sterling from their Barlow Jameson fund, in recognition of the value of his services to geological science. The great extent and value of Mr. Lesquereux's contributions to our knowledge of the fossil flora of North America are well known, and will be still better appreciated when his volume on the tertiary plants, now completed, but not yet distributed, shall be issued.

— Any contributions that American biologists may feel disposed to make toward the Hermann Müller foundation, referred to in our last issue, can be sent direct to the treasurer of the committee, Wilhelm Thurmman, Lippstadt, Germany, or they will be received for and forwarded by Professor William Trelease, Madison, Wis.

— The death (March 2) is announced of Isaac Todhunter, whose name has been a terror to the average college-student of the present generation. He was born at Rye in 1820, and was senior wrangler in 1848. A large portion of his energy was devoted to the production of the invaluable mathematical text-books and treatises which are so well known.

— Capt. Bernard, in the course of a journey into the far interior of Algeria, twenty kilometres north of the Bou Saada River, found a singular flat-topped butte whose elongated rocky summit rises sixty-five feet vertically from the talus which crowns its sloping base. This place, called by the Algerians 'El Gueliaa,' forms a rocky table one hundred and seventy-five feet wide by six hundred feet long, reached by a stairway cut on the northern side. On this plateau has been erected a structure, still in a remarkable state of

preservation, and, from the nature of its materials, apparently of Roman origin. On the east is a large rectangular stone building, containing eight or ten apartments opening upon an inner court. North of this building a vaulted cistern is dug in the rock: sixty feet to the west are two others, side by side, one vaulted over, and the second open to the sky. It is very difficult to say how these cisterns were filled, as there are no springs, or traces of wells, in the vicinity. It was evidently a post established for some special purpose. At Mesaad oasis a hillock thirty or thirty-five feet high bears the broken remains of a Roman gate. The Arabs have tunnelled or ditched the hillock for brick-clay; showing, that beneath the Roman remains now so long abandoned, and over the beds of chalk, salty earth, and clay, which form the mound, there are abundant remains of an earlier occupation, apparently for a considerable period, by a race whose stone weapons and tools, fragments of stone and ivory, and other rejectamenta, are their only memorial.

— The expedition charged by Russia with the task of exploring the ancient bed of the Oxus has concluded its work. The former path of the stream has been subjected to careful levelling from Khiva to the Caspian; proving that it is possible to turn the river into its old course only at the expense of a canal two hundred kilometres long, which is equivalent to a permanently adverse decision on its practicability.

— Signor F. P. Moreno, director of the anthropological museum of Buenos Ayres, was authorized in 1882 to undertake a journey into the interior of Bolivia for purposes of anthropological study. He now reports having visited the provinces of Cordoba, San Luis, and Mendoza as far as the slope of the Andes. During a year's travel he has studied the modern, as well as the traces of the former, inhabitants, and has exhumed in many places bones, weapons, inscriptions, and relics of burials, and has made plans and photographs of the remains of ancient villages. He believes he has obtained full material for a study of life in these regions before the Spanish conquest. He visited the whole extent of the so-called road of the Incas to the Uspallata Pass, when compelled to return by the advent of winter, and has pretty thoroughly explored the range of the same name.

— The material accumulated by the Krause brothers in Alaska, 1881-82, is being rapidly worked up. In the *Botanisches centralblatt* (Cassel, 1883, Nos. 41-43) Karl Müller publishes an account of the mosses of the Chukchi peninsula. He finds twenty-eight new out of seventy-five species collected, certainly a rather unusually large proportion. One of these, a cleistocarpous form allied to *Voitia*, is erected into a new genus by the name of *Krauseella*.

Dr. Hartlaub, in Cabanis's journal, enumerates the birds obtained at the head of Lynn Canal, near the mouth of the Chilkat River, S. E. Alaska. *Lagopus leucurus*, *Certhia familiaris*, *Dendroica Townsendi*, *Sialia arctica*, *Chrysomitris pinus*, *Sphyrapicus ruber*, and *Tinnunculus sparverius* are noted as new to the region, though several of them may be only occa-